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STATE OF ALASKA
Walter J. Hickel, Governor

ANNUAL REPORT OF PROGRESS, 1967 - 1968

FEDERAL AID IN FISH RESTORATION PROJECT F-5-R-9

SPORT FISH INVESTIGATIONS OF ALASKA

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INTRODUCTION

This report of progress consists of findings and work accomplished under the State of Alaska Federal Aid in Fish Restoration Project F-5-R-9, "Sport Fish Investigations of Alaska."

The project during this reporting period was composed of 21 separate studies. Of these, seven jobs continued the inventorying and cataloging of the numerous waters, providing a comprehensive index of the State's recreational waters. Nine jobs accomplished special studies involving Dolly Varden, grayling, silver salmon, king salmon and sheefish, among others. The remaining five jobs are designed to accomplish creel census, migration, access and silver salmon egg-take studies. The egg-take study, Job 7-F, was inactive because egg-takes were accomplished under other projects.

Special reports on specific phases of the Dolly Varden Life History Study have been published in the Department's Research Report series.

The information gathered from all of these studies provides the background necessary for better management and assists in development of future investigational studies.

The subject matter contained within these reports is often fragmentary in nature. The findings may not be conclusive and the interpretations contained therein are subject to re-evaluation as the work progresses.

RESEARCH PROJECT SEGMENT

STATE: ALASKA Name: Sport Fish Investigations of Alaska.

Project No.: F-5-R-9 Title: Inventory and Cataloging of the Sport Fish and Sport Fish Waters in Southwest Alaska.

Job No.: 6-A

Period Covered: July 1, 1967 to June 30, 1968

ABSTRACT

Winter oxygen samples taken from six Kodiak Island lakes indicated unusually favorable 1967-68 winter conditions. Two new major sport fishing lakes on Kodiak Island were mapped, and six lakes on the Adak Naval Base were entered in the lake survey files. Four additional Kodiak Island streams were surveyed and entered in the stream catalog files. The fourth consecutive year of June variable-mesh gill netting was conducted in 22 Kodiak Island lakes to evaluate the rainbow trout, Salmo gairdneri stocking program. Aerial and ground counts were made for steelhead trout and king salmon, Oncorhynchus tshawytscha in rivers on southern Kodiak Island. Aerial and ground counts were made for silver salmon, O. kisutch in streams on northern Kodiak Island. Creel census for pink salmon, O. gorbuscha and Dolly Varden, Salvelinus malma was conducted on the Buskin River, and Dolly Varden tag recovery surveys were conducted in other streams of northern Kodiak Island. Experimental egg-takes for silver salmon at Lake Rose Tead and Buskin Lake evaluated method of capture and size and age composition of these populations. Assistance was given to two public access problems and two multiple-use water projects.

RECOMMENDATIONS

Physical surveys of lakes and streams in the area should continue, with inclusion in the lake survey files of the larger lakes on southern Kodiak Island and Afognak Island.

Biological surveys of sport fish populations in the lakes and streams of the area need more detailed analysis. Investigation of size and age composition should be made for Karluk River king salmon, Lake Rose Tead silver salmon, and Buskin River sockeye salmon, O. nerka. A study of catch variance should be made for the variable-mesh gill nets used for sampling. Improved creel census methods should be explored for the Dolly Varden, pink salmon, and silver salmon sport fisheries on Buskin River; the Dolly Varden and silver salmon creel census should include age and size sampling. Experimental egg-take investigations at Lake Rose Tead should include extensive age and size analysis and correlation of weight with fecundity. Distribution and timing studies of capelin, Mallotus villosus on Kodiak Island beaches should be expanded to include determination of age and sex composition and embryological development.

OBJECTIVES

1. To assess and inventory the physical, chemical, and biological characteristics of all potentially significant sport fishing streams and all lakes under management consideration in the region.
2. To make surveys on lakes, streams, and coastal marine areas for establishing the magnitude, distribution, timing, yearly fluctuations, and angler harvest of sport fish populations in areas of particular concern to resource management.
3. To investigate sources of Dolly Varden and silver salmon egg-takes which appear to have significant future value in sport fish management; to attempt small-scale pilot egg-takes as a test of feasibility, and to conduct other studies related to egg-taking and population evaluation as found necessary.
4. To evaluate multiple-use development projects (public and private) and their effects on the region's streams, lakes and coastal marine areas for the proper protection of the sport fish resource.
5. To assist as required in the investigation of public access status to the region's sport fishing waters.

TECHNIQUES USED

Standard techniques, as described by Marriott, 1964, were used in surface mapping, in analysis of water samples and in gill net sampling.

Physical stream surveys were conducted as described by Marriott, 1966.

Stream and lake captures of silver salmon were made with a 60-foot beach seine of 1-inch square webbing 12 feet deep, and with a 100-foot beach seine of 3/4-inch square webbing 9 feet deep.

FINDINGS

Assessment and Inventory of Sport Fish Environment

Winter observations for dissolved oxygen concentration, pH values, and ice thickness were made in mid-February, 1968, on six lakes of particular concern. Results of these observations are shown in Table 1.

TABLE 1 - Mid-Depth Water Samples for Kodiak Island Lakes in February, 1968.

<u>Lake</u>	<u>Inches of Ice Cover</u>	<u>Oxygen (ppm.)</u>	<u>pH</u>
Snag	21	3.8	5.8
Dragonfly	19	9.5	5.9
Big (Beaver)	16	9.9	5.8
Buskin	17	13.2	6.4
Genevieve	17	13.8	6.4
Wonder	Over 36 - slush	-	-

These moderately high dissolved oxygen levels for Snag, Dragonfly, and Big Lake were substantially higher than the respective values of 0.0, 2.1, and 1.3 ppm. obtained in mid-February of 1967, and reflect the unusually mild weather conditions which prevailed during most of the winter. The thick slush conditions at Wonder Lake, a newly stocked alpine lake at the 1100 foot elevation of Old Woman Mountain, resulted from a recent series of diurnal runoff and freezing. No winter-kills of sport fish species are anticipated for any Kodiak area lakes during the 1967-68 period.

Two major Kodiak Island Lakes were mapped for surface area and lake survey cards were completed for file reference.

Dry Spruce Lake was mapped at 108.3 acres and a maximum depth of 86 foot was recorded. A flow of 3.9 cfs_x was determined at the outlet during low water stage. This mapping, combined with other biological investigations, enabled the incorporation of the lake into the stocking program, and it was stocked with 10,830 rainbow trout fry on July 28, 1967.

Barry Lagoon was mapped at 127.3 acres. The maximum depth is approximately 15 feet, with outflow entirely through seepage at the seaward spit. This lake was stocked with 5,000 silver salmon fry in 1965 and produced good fishing for landlocked silvers and Dolly Varden in 1967.

Lake survey cards were begun for six of the most important sport fishing lakes on the Adak Naval Base. These are shown in Table 2.

TABLE 2 - Surveyed Sport Fishing Lakes on Adak Naval Base.

<u>Lake</u>	<u>Est. Surface Acreage</u>	<u>Max. Depth</u>	<u>Rainbow Trout Fry Stocking</u>
Andrew	2000	86'	272,000 (1954-56)
Leonne	70	20'	2500 (1954); 1000 (1955)
Heart	28	25'	1500 (1954); 4300 (1956)
De Marie	70	30'	1000 (1954); 1800 (1956)
Haven	8	6'	6500 (1956)
Mitt	4	15'	2800 (1957)

It was necessary to determine lake surface areas and other physical entires from topographic map references. Lake depths and all biological data are based on observations made in 1959 by Roger Reed.

Assessment and Inventory of Sport Fish Populations

Rainbow and Steelhead Trout:

For the fourth consecutive year, monofilament nylon sampling gill nets were used to obtain late-June population size and growth data from Kodiak Island lakes (Figure 1). The results of this sampling are shown in Table 3.

Evaluation of these samples suggests the following relationships:

1. The good growth and survival of rainbow trout in Snag Lake, where February, 1967 oxygen was 0.0 ppm., indicate that winter-kill in Kodiak Island lakes cannot be accurately predicted from February water sample data.
2. Good survival, but moderately slow growth of the rainbow trout in the Beaver Ponds and Dragonfly Lake, indicates that these lakes should not be stocked in densities over 200 fry per surface acre.
3. The phenomenal growth and good survival of the 1965 brood year rainbow trout in Bull Lake indicate that this eutrophic lake has been underestimated as a producer and can withstand stocking densities of over 200 fry per surface acre.
4. Poor survival was apparent again this year in the Three Sister Lakes. There is also evidence of some natural spawning of 1962 and 1963 brood year females in these lakes.
5. Good growth and survival was displayed from the 1966 stocking of rainbow trout fry in Jupiter and Saturn Lakes, where one-year-old fish up to 8.2 inches long were taken. These lakes should produce excellent fishing in 1968.
6. Large populations of Dolly Varden in Uranus and Neptune Lakes make these lakes undesirable for future stocking.
7. The 1966 aerial drop of silver salmon fry into L.I.#72 Lake was apparently very successful, and the observed good growth and survival of these fish should produce good fishing in 1968.
8. There was an apparent loss of the 1966 rainbow trout stocking in Long Lake, where stunted 1962 and 1963 brood year silver salmon plants remain. There is also abundant sign of natural reproduction of silver salmon in this lake. Future stocking is not recommended.
9. There was an apparent loss of the 1966 rainbow trout stocking in Tanignak Lake, where large landlocked silver salmon were observed in late 1966. No silver salmon are now evident, and it is recommended that the lake be restocked with rainbow trout in 1967.
10. Excellent growth and survival of 1965 brood year silver salmon in Barry Lagoon and poor growth and survival of 1965 brood year rainbow trout in Pony Lake emphasizes the suitability of silver salmon in partially saline lagoon-type lakes. Only silver salmon are recommended for future plants in Pony Lake.

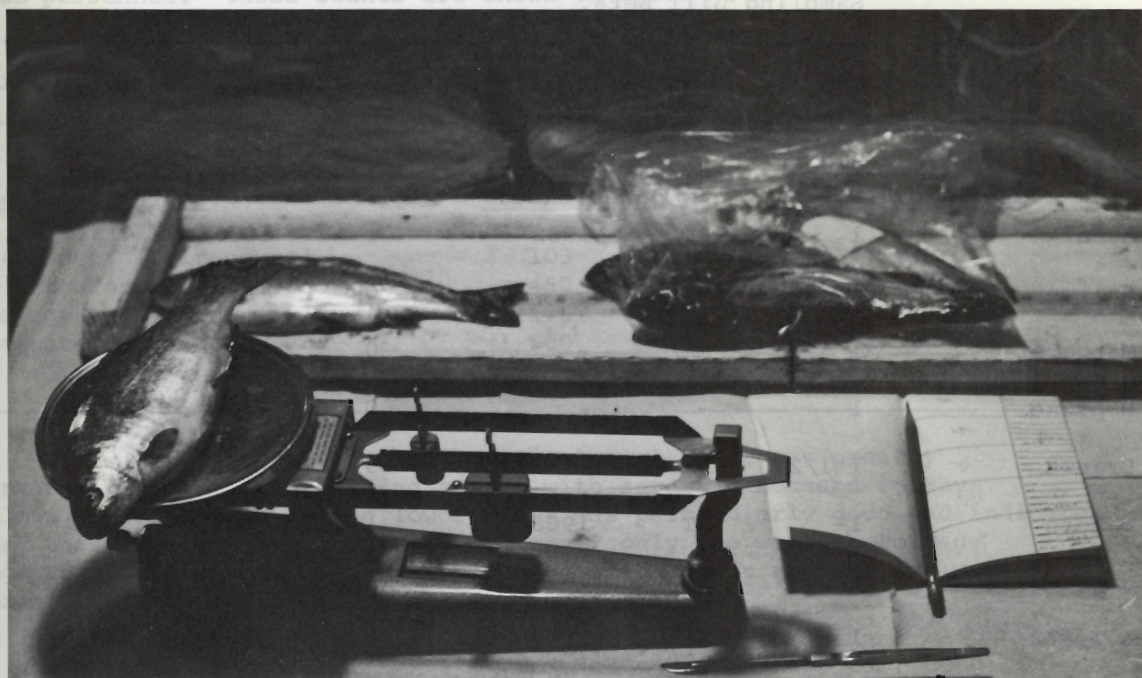


FIGURE 1 Rainbow Trout Samples Being Weighed, Measured and Aged.

TABLE 3 - June, 1967 Kodiak Area Lake Sampling with 125' x 6' Sampling Gill Nets.

Lake	Hrs. Set	Species	Brood Yr.	Number Caught	Mean Length	Mean Weight
Jack	1	RT	1966	5	6.2"	56.3 g.
Lee	1	RT	1966	3	7.8	109.9
Beaver Ponds	1/2	RT	1965	6	8.2	121.8
Snag	1	RT	1965	6	9.0	169.2
Dragonfly	1/2	RT	1966	10	5.8	40.9
		RT	1963	1	8.5	102.2
Horseshoe	1	RT	1966	3	6.6	57.4
Bull	1	RT	1965	6	12.7	456.9
Lupine	1	RT	1966	6	7.8	99.1
Cicely	1	RT	1966	1	6.9	79.5
		RT	1963	1	9.0	115.7

TABLE 3 (Cont.) - June, 1967 Kodiak Area Lake Sampling with 125' x 6' Sampling Gill Nets.

<u>Lake</u>	<u>Hrs. Set</u>	<u>Species</u>	<u>Brood Yr.</u>	<u>Number Caught</u>	<u>Mean Length</u>	<u>Mean Weight</u>
Caroline	1	RT	1966	1	8.4	134.0
Aurel	1	RT	1962	1	13.6	413.4
Heitman	1	-	-	0	-	-
Margaret	1	-	-	0	-	-
Neptune	1	-	-	0	-	-
Uranus	1 1/2	DV	-	9	9.5	-
Saturn	1	RT	1966	1	5.9	38.1
Jupiter	1	RT	1966	3	6.8	58.2
L.I.#72	1	SS	1966	5	5.0	17.8
Long	1	RT	1965	1	7.1	59.6
		SS	1966	1	5.2	21.9
		SS	1963	1	11.3	184.7
		SS	1962	1	14.1	448.3
Tanignak	1	-	-	0	-	-
Barry	2 1/2	SS	1965	18	10.5	182.0
		DV	-	6	15.3	598.8
Pony	1	RT	1965	1	6.2	42.4

Steelhead trout population surveys were made in mid-May on rivers at the south end of Kodiak Island. Aerial observation accounted for 10 spawners in upper areas of Frazer River, 20 spawners at the outlet of Red Lake, and 16 spawners in the upper half of Karluk River. The lower half of Karluk River was drifted in mid-May. Visibility was quite limited and only 5 spawning steelhead trout were observed. According to the Portage cabin log, 19 steelhead trout were taken at Portage in April by subsistence fishermen from Larsen Bay. These observations continue to verify that although Karluk River has the largest population of spawning steelhead on Kodiak Island, this population is only approximately 200 fish. All evidence indicates that the spring closure should be continued to protect steelhead trout spawning in all south-end streams.

King Salmon:

Unacceptable correlation between various aerial observers making king salmon counts in the Karluk River during recent years has prompted the initiation of separate drift and aerial counts. Poor August weather prevented Division of Commercial Fisheries personnel from making aerial king salmon counts this year; however, a July 22-23 ground count

and August 23, 1967 aerial count comparison was made by Division of Sport Fish personnel. These counts are shown in Table 4.

TABLE 4 - Ground and Aerial Counts of Karluk River King Salmon in 1967.

<u>Section of River</u>	<u>July 22-23 Ground Count</u>	<u>August 23 Aerial Count</u>
Above weir (weir count)	103	250
Weir to Portage	450	150+
Portage to Lagoon	575	525
Estimated total run	1,500	1,500

The weir-to-Portage segment of the Aerial count was greatly hindered by the mixing of king salmon with several thousand sockeye salmon. Correlation in the lower river was particularly good and indicates that those past aerial counts, which cover only the weir-to-Portage segment of the river, can be expected to account for approximately 50 percent of the run.

A small sample of 19 king salmon scales and measurements were gathered from mid-June 1967 sport fishermen at Portage. The breakdown of this sample is shown in Table 5.

TABLE 5 - Age and Size Composition of Mid-June Karluk River King Salmon Sport Catches.

<u>Age</u>	<u>Males (means)</u>			<u>Females (means)</u>		
	<u>Number</u>	<u>Length (inches)</u>	<u>Weight (pounds)</u>	<u>Number</u>	<u>Length (inches)</u>	<u>Weight (pounds)</u>
1.1 (3 ₂)	2	15.8	1.5			
2.1 (4 ₃)	2	16.9	2.1			
1.2 (4 ₂)	1	32.0	15.3			
1.3 (5 ₂)	1	39.5	30.7	4	37.5	26.7
2.3 (6 ₃)	2	37.0	23.4			
1.4 (6 ₂)	2	40.2	32.3	3	38.5	29.5
Regenerated	2	37.8	25.1			

An August 22, 1967 aerial count of king salmon in Ayakulik River was hampered by turbid water. Only 80 king salmon were seen in the forks area. The 100 fish observed in the lower section of Sturgeon River on this date were probably chum salmon.

Silver Salmon:

Ground and aerial enumeration of silver salmon in spawning areas of northeastern Kodiak Island was conducted during October and November of 1967. These survey results are shown in Table 6.

TABLE 6 - 1967 Silver Salmon Spawning Ground Enumeration in
Northeastern Kodiak Island.

<u>System</u>	<u>Escapement Count</u>	<u>Escapement Estimate</u>	<u>Catch Estimate</u>	<u>Total Run Estimate</u>	<u>Peak of Spawning</u>
Buskin L.	1550	2200	600	2800	11/2
L. Rose Tead	2350	2600	100	2700	10/14 & 11/2
Salonie Cr.	375	600	50	650	11/2
American R.	272	300+	60	360+	10/25
Roslyn Cr.	22	60+	40	100+	11/1
L. Miam	(aerial)	800	0	800	10/20

These counts are indicative of the excellent runs experienced throughout most of Kodiak Island in 1967.

Of particular interest is the Lake Rose Tead population, which has shown a dramatic increase since alteration of the lake rearing habitat by the 1964 land subsidence, (Marriott, 1965). The 1965, 1966, and 1967 escapement estimates have been 600, 1600, and 2600 respectively. Spawner distribution within this system is indicated by the actual ground counts made in October and early November, 1967. These are shown in Table 7.

TABLE 7 - 1967 Lake Rose Tead Silver Salmon Ground Counts.

<u>Area</u>	<u>Count</u>
W. Mountain Spring	80
Middle Spring	70
Major Spring Creek	525
Roadside Creek	160
Left Spring	650
Middle Creek	60
Right Spring and Shoreline	340
Gravel Pit	225
Observed in Lake on 11/4	100+
Egg-take of 10/17 & 18	<u>140</u>
Total	2,350+

Silver salmon spawning peaked sharply in the Buskin River system on November 2, 1967, although some prolonged spawning occurred in the upper main river until late December. The distribution of fish accounted for on November 3, 1967 is shown in Table 8.

TABLE 8 - 1967 Buskin River System Silver Salmon Ground Counts.

<u>Area</u>	<u>Count</u>
Spring Creek	50
Chalet Creek	30
Observed in Lake on 10/3	250+
Lake Outlet to Upper Bridge	410
Upper Bridge to Bunker Creek	570
Bear Creek	20
Bunker Creek	120
Ft. Greely Reservoir	30
Egg-Take of 10/19	50
Total	1,550+

Pink Salmon:

A creel census was conducted on the Buskin River throughout the month of July, 1967 to determine the size of the pink salmon sport fishery and the method of capture. This census was based on observations made during daily evening index hours and interpolation based on comparison of these index hours with 24-hour observation periods. The results of the creel census are summarized in Table 9.

TABLE 9 - 1967 Buskin River Pink Salmon Creel Census Summary

<u>Category</u>	<u>Snagged Fish</u>		<u>Unsnagged Fish</u>		<u>Total</u>
	<u>Upper R.</u>	<u>Lower R.</u>	<u>Upper R.</u>	<u>Lower R.</u>	
Calculated Man-hrs. effort (Interpolated for missing time periods)	603	760	165	1176	2704
Catch per hour (Geometric means from observation period ratios)	0.9439	0.6445	0.3333	0.3636	
Calculated seasonal catch	<u>569</u>	<u>490</u>	<u>60</u>	<u>428</u>	1547
	V		V		
	1059		488		
Percentage of catch	68.5%		31.5%		
Percentage of effort	50.4%		49.6%		

The Division of Commercial Fisheries' peak aerial count of pink salmon in the Buskin River this year was 27,000 fish. The sport fishing take was, therefore, approximately 5.4 percent of the entire run. Data from this creel census were used to make recommendations for sport fish regulation changes.

Dolly Varden:

A Dolly Varden creel census was conducted on the Buskin River during the entire month of May, which encompasses the spring out-migration of Dolly Varden from Buskin Lake. This year's estimates were based on man-hours of effort derived from three or four random hourly checks per day, with interpolation for missing time periods. Catch per man-hour was based on periodic hour-long observations at locations of concentrated effort. A total of 6,085 man-hours of effort and a total catch of 6,611 Dolly Varden were accounted for. Measurement data were incomplete, but the mean length of Buskin River Dolly Varden has been noticeably decreasing in the past 3 years, and averaged approximately 10 inches this year. One Buskin Lake released tag and three American River released tags were taken in this fishery.

On July 18, 1967, a ground count along the entire length of Saltery Creek showed a population of 1,020 Dolly Varden, with an active in-migration underway. No tags were observed on any of these fish.

Ground counts along the entire American River at various dates in 1967 are summarized in Table 10.

TABLE 10 - 1967 Dolly Varden Ground Counts on American River.

<u>Date</u>	<u>Total Count</u>	<u>Tags Observed</u>
July 7	0	0
July 18	0	0
August 15	807	1 (R-R)
September 7	240	0
October 23	672	0

During the first two weeks in August, tag-recovery observations were also made in Roslyn, Myrtle, Pillar, and Anton Larsen Creeks. A total of 435 Dolly Varden was counted, but no tags were observed on any of these fish.

Tag returns from the 1,107 Dolly Varden tagged in the northern Kodiak area in 1965 and 1966 have been insufficient to statistically evaluate population sizes or the extent of intra-stream movements.

Arctic Grayling:

As an aid in evaluating the arctic grayling stocking of Cascade Lake, 35 gravid adult grayling from the Glennallen area were fin-clipped (adipose only) and measured before release into Cascade Lake in late May 1967. These included 15 males of mean length 9.35 inches, mean weight 0.281 pounds and 20 gravid females of mean length 9.14 inches, mean weight 0.274 pounds.

Shoreline observations at Cascade Lake on July 12, 1967 indicated heavy signs of fish activity in the lake, most of which appeared to be caused by grayling approximately 5 inches long. This was further verified on August 28, 1967, when a close shoreline observation made around one-third of the lake, accounted for 13 grayling approximately 7 inches long, 1 grayling approximately 11 inches long, and 1 dead grayling 7.3 inches

long. No stickleback or rainbow trout were observed. These observations indicate that the June 1966 stocking of 32,000 grayling fry in this rehabilitated lake was highly successful. Further evaluation must await the June 1968 gill net sampling.

Capelin:

Capelin runs on the beaches in the Kodiak area occurred in 1967 on the highest tides of late May. Moderate numbers were observed on all sandy beaches of Chiniak Bay, and heavier concentrations were reported on Pasagshak Beach. Poor weather prevented aerial observations of distribution. The trend for the past four years has been toward a very heavy concentration of Capelin on only Silver (Roslyn) Beach on even-numbered years and a moderate concentration on all Chiniak beaches on odd-numbered years. Pasagshak beaches have apparently been good every year.

Experimental Egg Takes

With excellent populations of silver salmon evident in the northern Kodiak Island areas in 1967, studies continued in developing methods suitable for an efficient large-scale egg-take operation.

Original plans to construct weirs and holding pools on two main spring tributaries to Lake Rose Tead were carried out in early October 1967. It was anticipated that upon entering these roadside streams to spawn, the salmon could be readily trapped, sorted, and artificially spawned. The wire-mesh weirs proved to be extremely difficult to maintain, as leaf clogging and subsequent undermining were constant problems. On October 16, 1967, at which time no silver salmon had yet been trapped, an aerial observation established that at least 500 ripening silver salmon were tightly concentrated in the main channel of Lake Rose Tead off the gravel pit area. Approximately 300 of these fish were taken in one seine haul on October 17, 1967. These fish were nearly all gravid, and approximately 600,000 eggs were eventually taken from this single seine haul, (Figure 2). The outstanding advantage of this method of capture is that the fish are available in this area for approximately three weeks, enabling firm scheduling of operations. The use of weirs would restrict operations to about two days, usually corresponding with flood conditions and inclement weather. With an escapement of approximately 2,600 silver salmon in Lake Rose Tead in 1967, it is estimated that 2 million eggs could have been taken in seining operations without endangering the population.

A small egg-take at the outlet of Buskin Lake was attempted on October 19, 1967. Although several hundred silver salmon were available in this area, large boulders and concrete debris prohibited seining at this site. Approximately 100 silver salmon were seined in several hauls in the upper section of Buskin River, and 175,000 eggs were taken.

Age and size analysis of the Lake Rose Tead and Buskin River silver salmon populations, derived during egg-take operations, is shown in Table 11.



FIGURE 2. Size, Age and Fecundity Sampling of Lake Rose Tead Silver Salmon.

TABLE 11 - 1967 Lake Rose Tead and Buskin Lake Silver Salmon Age and Size Analysis (Females Only).

	Lake Rose Tead	Buskin Lake
Age 1.1 (3 ₂)	76%	0%
Age 2.1 (4 ₃)	24%	100%
Mean Length	28.4 in.	29.0 in.
Mean Weight	10.5 lbs.	10.3 lbs.
Mean Fecundity	4,510	4,637*

* One 10.6 lbs. female only.

Public Access Assistance

Assistance to public access was limited to two areas on the Kodiak Road System.

At the Cape Chiniak Satellite Tracking Station, new no-trespassing signs were preventing access via the Sequel Point Road to Hidden Lakes. Permission was obtained to post fishing lake guide-signs through the restricted area.

At Orbin Lake, conditional approval for a State gravel sale provided for public access to Orbin Lake and the Beaver Ponds loop road.

Evaluation of Multiple Water Usage

Multiple water usage projects in the Kodiak area currently consist of the Buskin Lake antenna field herbicide program and the Terror Lake hydroelectric project. Both of these projects remain in the planning stage.

The Navy Buskin Lake antenna field herbicide program has been delayed until at least the spring of 1968 due to unavailability of 2, 4-D defoliant. Application of a substitute chemical, water-soluble bromocil (Du Pont Hi-Bar), has yet to be approved by the Kodiak Naval Base sanitation officer. Close monitoring of biological effects is planned by the Division of Sport Fish staff as an integral part of this program.

A request for recommendations on recreational development of the proposed Terror Lake hydroelectric power project was received from the Federal Power Commission. In reviewing the area-capacity curves furnished with this request, it was found that the lake level is projected to fluctuate from 1,130 feet to 1,410 feet elevation in the course of seasonal operations. This fluctuation of 280 feet, combined with steep shorelines and normal alpine oligotrophic conditions, would render this lake unsuitable for sport fishing. It is recommended that the sport fish enhancement conditional approval be waived for this lake, as several more-suitable undeveloped fly-in lakes are available in the area.

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Date: April 1, 1967

s/ Alex H. McRea, Director
Sport Fish Division



Alaska has a Unique Problem in Rearing Fish through its cold Winter. Here the "Cooling Ponds" of a Military Electrical Generating Plant are Utilized to Grow Fish in Warm Waters. The Biologists are Determining Growth and Survival by Weighing the Fish.